

## REFERRED OTALGIA IN EKITI, NIGERIA

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## ABSTRACT

**Background:** Referred otalgia is defined as ear ache due to diseases in organs around the ear or other head and neck organs. This resulted from complex nervous connections in the ear, head and neck organs. This study aimed at determining the clinicoepidemiological patterns, impact on quality of life and aetiology of referred otalgia in Ekiti state university teaching hospital, Ado Ekiti, Nigeria. **Materials and Methods:** This is a prospective hospital based study of patients with diagnosis of referred otalgia in ear, nose and throat department of Ekiti state university teaching hospital, Ado Ekiti. The study was carried out over a period of one year; (May 2016 to April 2017). Consent was obtained from the patients. Data were obtained by using pretested interviews assisted questionnaire. Data obtained were collated and analyzed by using SPSS version 16.0. **Results:** A total of 2,616 patients were seen out of which a total of 116 patients had referred otalgia. The age group 21-30 year has the highest prevalence of 27.6%. There were 66.3% males and 33.7% females given a male to female ratio of 2:1. Majority (89.1%) of the studied patients were Christian. About 42.2% of our patients are secondary school leavers. Majority (61.2%) are married. About 26.7% were students/apprentice and 24.1% of them were civil servants. In this study, majority of the referred otalgia patients were secondary to tonsillitis in 28.4% of them. The findings in this study revealed higher proportion (58.6%) of our patient had single attack of referred otalgia while over 41.4% had recurrent referred otalgia. Unilateral referred otalgia accounted for 75.0% while bilateral otalgia accounted for 25.0%, with predominantly right ear involvement in 41.4% of our patients. Majority of the studied patients noticed 37.9% sleep disorder, 56.9% absenteeism and 44.8% social functioning. Prior to presentation in ENT department about 50% of the patients had over the counter medication. **Conclusion:** Referred otalgia is a common otological presenting complaint in otorhinolaryngological practice. The age group 21-30 year has the highest prevalence of 27.6% and tonsillitis is the commonest cause. Diagnosis requires thorough history and examination of head and neck organs.

**KEYWORDS:** Otalgia, Referred Otalgia, Ear Neuroanatomy, Ear Diseases.

## INTRODUCTION

Otalgia also known as earache or ear pain is defined as an unpleasant experience in the ear causing patients of different ages to seek medical treatment.<sup>[1]</sup> Otalgia is an otological symptoms and not a diagnosis or disease.<sup>[2,3]</sup> The aetiological agent must be sought for to enable effective treatment outcome.<sup>[2,4]</sup> This symptom is a very common presenting complaint in otorhinolaryngological, head and neck clinical practice worldwide.<sup>[5]</sup>

During the embryological development otic cysts are located between the pairs of branchial arches, with cyst location resulting in the domination of various cranial nerves. Other organs in the head and neck region are also under the control of these sensory nerves, resulting in referred otalgia.<sup>[6]</sup> These organs include pharynx, orodental organs, larynx and upper segment of the oesophagus.

Referred otalgia arises by various mechanisms<sup>[7-9]</sup>, it can arise from the inability of the brain to distinguish the origin of pain because neurons starting from either the visceral or somatic sensation on their pathway to the brain by same pathway.<sup>[10]</sup> Miscommunication may also occur at the ventral posterior nucleus between the lateral and medial levels of the thalamus. Referred otalgia may also be a high-level phenomenon occurring at the cerebral cortex itself.<sup>[7]</sup>

Neuroanatomy of the ear innervation is by several sensory cranial nerves. The auricle is supplied by cranial nerves V, VII, X, C2, and C3. The external auditory meatus is also supplied by cranial nerves V, VII, and X. The tympanic membrane is by cranial nerves VII, IX, and X. The middle ear is innervated by cranial nerves V, VII, and IX. All these 4 cranial nerves, with cervical nerves 2 and 3 also innervate other regions of the body outside the ears.<sup>[11,12]</sup>

These regions include nose, sinuses, oral cavity, pharynx, larynx and oesophagus.<sup>[13-16]</sup> Orodonal structures were mainly supplied by cranial nerve V.<sup>[13,14]</sup> Pharynx are supplied by cranial nerve V, IX.<sup>[14,15]</sup> larynx and upper segment of the oesophagus were innervated by cranial nerve X.<sup>[15,16]</sup> Neck structures were innervated by cervical nerve branches C<sub>2</sub> and C<sub>3</sub>.<sup>[16]</sup>

In otorhinolaryngological practice full clinical history and detailed physical examination of ear and adjacent structures in the head and neck should be performed to arrive at definitive diagnosis.<sup>[11,12]</sup> Otalgia can be divided into two main types primary otalgia and referred otalgia.

Referred otalgia is ear pain that originates from organs pathology outside the ear.<sup>[17,18]</sup> This is also called non-otogenic, secondary or extrinsic otalgia. Referred otalgia depends on the sensory nerve supply of the affected pathological organ other than the ear. Affection of the cranial nerve V (auriculotemporal nerve) pain is due to the diseases of the temporomandibular joint dysfunction, dental diseases, trigeminal neuralgia and mandibular osteomyelitis. In the cranial nerve VII (posterior auricular nerve) pain is due to diseases such as acoustic neuroma and herpes zoster infection. Cranial nerve IX (Jacobson's nerve) pain is due to diseases like tonsillitis/pharyngitis, sinusitis, pharyngeal tumor, and glossopharyngeal neuroma. Cranial nerve X (Arnold's nerve) pain is affected by diseases like laryngopharyngeal reflux, cricopharyngeal spasm and vagal stimulations. The greater auricular (C2) nerve pain and lesser occipital (C3) nerves pain are affected by cervical spine degenerative disease, cervical root cysts, Arnold-Chiari type, whiplash, vascular diseases, fibromyalgia, and other psychogenic causes.<sup>[18]</sup> In addition a thorough physical examination of all parts of the head and neck are required in all patients with otalgia.<sup>[19,20]</sup> Thus, a detailed patient history and through exam are required to accurately determine whether otalgia is primary or referred.<sup>[17]</sup>

There is paucity of literature on the subject referred otalgia in developing countries and Nigeria in particular. This study aimed at determining the clinicoepidemiological patterns, impact on quality of life and aetiology of referred otalgia in Ekiti state university teaching hospital, Ado Ekiti, Nigeria.

## MATERIALS AND METHODS

This is a prospective hospital based study of patients with complaints of earache and diagnosis of referred otalgia. This study was carried out in ear, nose and throat department of Ekiti state university teaching hospital, Ado Ekiti. The study was carried out over a period of one year, (May 2016 to April 2017). Verbal consent was obtained from the patients/parents/guardian. A total number of 116 participants were enrolled into the study. Data were obtained by using interviews assisted questionnaire. The information obtained includes their biodata such as age, sex, occupation, religion and marital

status. Detailed history on earache, duration, onset, nature, aggravating factors, relieving factors, associated symptoms were obtained. Detailed otological history and other otorhinolaryngological, head and neck history on the various diseases including past medical and surgical history were obtained. Detailed clinical otorhinolaryngological, head and neck examination were done with emphasis on otological/otoscopy findings. Further detailed oral (dental) temporomandibular joint, posterior rhinoscopy and indirect laryngoscopy to arrive at definitive diagnosis. Patients were subdivided into those with otogenic or referred otalgia and their clinical characteristics were compared. All the participants had audiometric investigation done. Minor ear nose and throat procedure such as biopsy were done where indicated. Data obtained were analyzed using SPSS version 16.0. The obtained information were processed by descriptive method and illustrated by using tables, bar chart and pie charts.

Ethical clearance was sought for this study from the ethical committee of the institution. This was obtained before the commencement of this study.

## RESULTS

A total of 2,616 patients were seen in ear, nose and throat (ENT) department over the studied period. Out of which a total of 947 patients' complaints of otalgia and a total of 116 patients had referred otalgia. The prevalence of otalgia and referred otalgia was 36.2% and 4.4% respectively. The age group 21-30 year has the highest prevalence of 27.6%. Figure 1 demonstrated age group distribution of the studied patients.

There were 77 (66.3%) males and 39 (33.7%) females. Male to female ratio was 2:1. Majority 103 (89.1%) of the studied patients were Christian while 13 (10.9%) are Muslim. As per their educational level, 42.2% of them are secondary school leavers, 31.9% were graduates, and 21.6% had primary school leaving certificates while 4.3% are without formal education. Based on marital status, large percentages (61.2%) of our patients were married. Based on occupation status majority were 31 (26.7%) students/apprentice and 28 (24.1%) civil servants while minority were 8 (6.9%) farmers and 10 (8.6%) traders. The sociodemographic features of referred otalgia patients was demonstrated in table 1. Figure 2 demonstrated the mode of presentation of the patients in the department.

In this study, majority of the referred otalgia patients were secondary to tonsillitis in 33 (28.4%), temporomandibular joint disorder in 22 (19.0%), pharyngitis in 14 (12.1%) and 13 (11.2%) had laryngeal disorder. The details is shown in table 2.

In this study, main accompanied symptoms were sore throat in 59 (50.9%) patients, nasal blockage in 52 (44.8%) patients, lump sensation in the throat in 47

(40.5%) patients and 45 (38.8%) patients had rhinorrhea. Table 3 illustrated this findings.

The findings in this study revealed higher proportion 68 (58.6%) of patients had single attack of referred otalgia while 48 (41.4%) had recurrent referred otalgia. Unilateral referred otalgia accounted for 87 (75.0%) while bilateral otalgia accounted for 29 (25.0%) and right were more affected than the left accounted for 48 (41.4%). In table 4, characteristic pattern of referred otalgia in the patients were illustrated. Majority (56.9%) of the studied patients noticed sleep disorder, 66 (56.9%)

absenteeism and 52 (44.8%) social functioning. Others were shown in Fig.3.

Prior to presentation in ENT department about 50% of the patients had over the counter medication and 25.0% herbal treatment while 18.1% had prescribed medication and 7.8% did not seek medical treatment or intervention. Patients had some degree of satisfaction to prior treatment and were as follows: 6 (5.2%) prescribed medication, 37 (31.9%) over the counter and 22 (19.0%) herbs. In table 5, Pattern of management of referred otalgia patients were demonstrated.

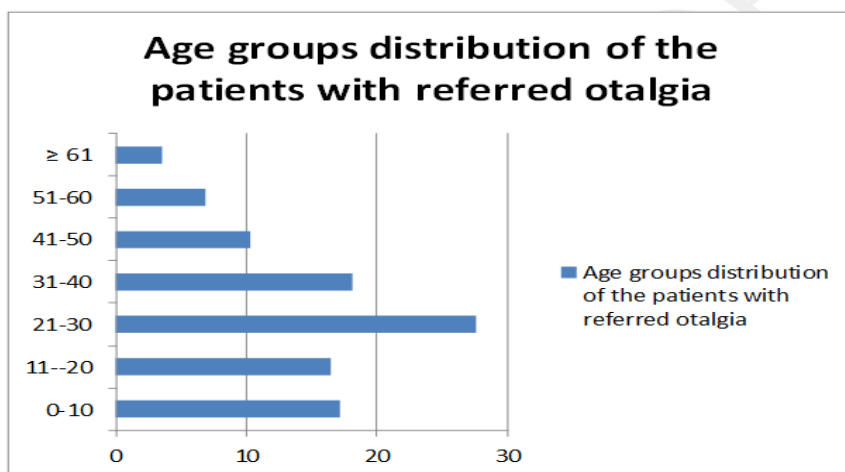


Figure. 1: Age groups (years) distribution of the patients with referred otalgia.

Table. 1: Sociodemographic features of patients with referred otalgia.

Sociodemographic features	Number	Percentage (%)
<b>Gender</b>		
Male	77	66.3
Female	39	33.7
<b>Domicile</b>		
Urban	64	55.2
Rural	52	44.8
<b>Religion</b>		
Christianity	103	89.1
Islamic	13	10.9
<b>Education level</b>		
None	5	4.3
Primary	25	21.6
Secondary	49	42.2
Tertiary	37	31.9
<b>Marital status</b>		
Single	36	31.0
Married	71	61.2
Divorce	9	7.8
<b>Occupation</b>		
Students/apprentice	31	26.7
Applicant	22	19.0
Civil servant	28	24.1
Farming	8	6.9
Trading	10	8.6
Others	17	14.7

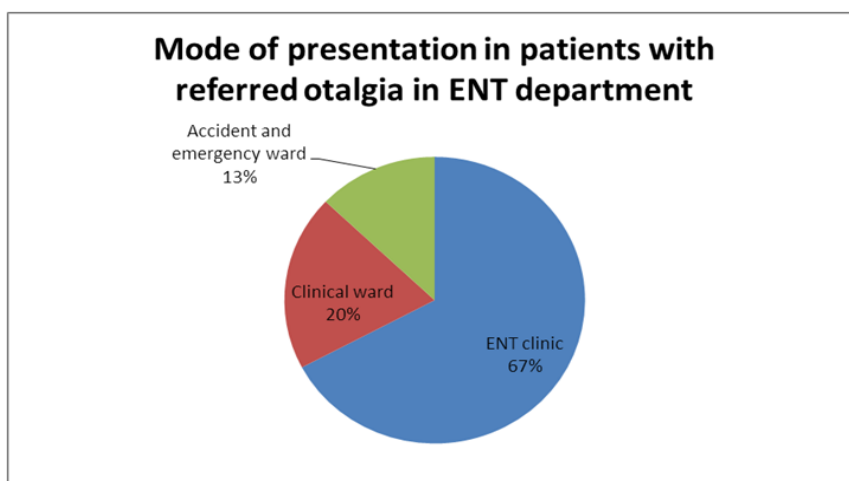


Figure. 2: Mode of presentation in patients with referred otalgia in ENT department.

Table. 2: Aetiology of referred otalgia in patients.

Aetiology	Number	Percentage (%)
Temporomandibularjoint disorder	22	19.0
Preauricular sinusinfection	7	6.0
Nasopharyngeal tumour	4	3.5
Pharyngitis	14	12.1
Tonsillitis	33	28.4
Dental disorder	11	9.5
Laryngeal disorder	13	11.2
Neuralgia	2	1.7
Psychogenic	3	2.6
Others	7	6.0

Table. 3: Accompany symptoms of referred otalgia.

*Symptoms	Number	Percentage (%)
Rhinorrhea	45	38.8
Nasal blockage	52	44.8
Postnasal discharge	32	27.6
Hawking	36	31.0
Sore throat	59	50.9
Cough	41	35.3
Hoarseness	28	24.1
Lump sensation in the throat	47	40.5
Toothache	33	28.4
Oral sore	17	14.7

NB

\*Some patients has more than one symptoms

Table. 4: Characteristics pattern of referred otalgia.

Pattern	Number	Percentage (%)
<b>Recurrence</b>		
Single episode	68	58.6
Recurrent	48	41.4
<b>Duration</b>		
Short duration	47	40.5
Long duration	69	59.5
<b>Laterality</b>		
Right	48	41.4
Left	39	33.6
Bilateral	29	25.0

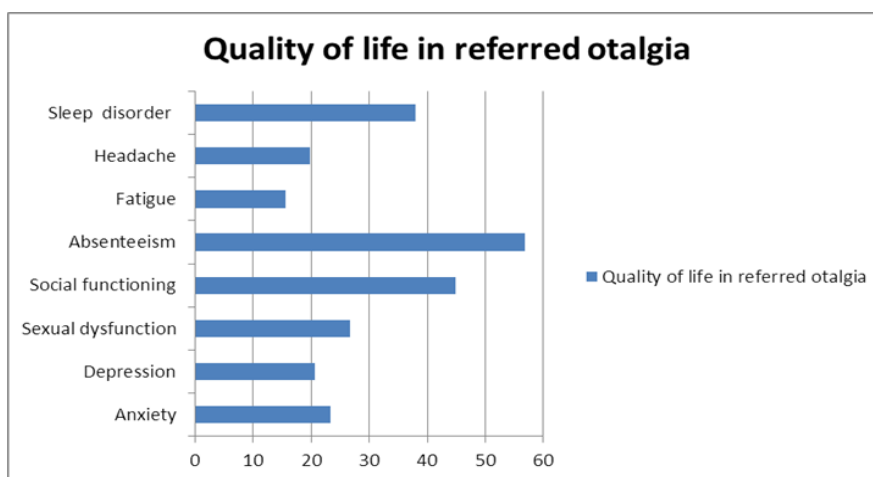


Figure. 3: Quality of life in referred otalgia.

Table. 5: Pattern of management of referred otalgia.

Pattern of management	Number	Percentage (%)
<b>Referral</b>		
Self reports	15	12.9
General practitioners	47	40.5
Dentist	11	9.5
Paediatrician	28	24.1
Others	15	12.9
<b>Previous treatment</b>		
No treatment	9	7.8
Herbs	29	25.0
Over the counter	58	50.0
Prescribed medication	21	18.1
<b>Previous Rx satisfaction</b>		
No treatment	Nil	0
Herbs	22	19.0
Over the counter	37	31.9
Prescribed medication	6	5.2

## DISCUSSION

This study revealed referred otalgia as a common cause of discomfort sensation in the ear forcing patients of all ages to consult their health care giver. In the developing countries there is low level of awareness and literature on many potential causes of referred otalgia. This has resulted into often wrong diagnosis and poor management by most experienced health care givers. This may be a result of complex neuroanatomy of the sensory innervation of the ear and knowledge on referred otalgia. Sensory innervations of the ear with other organs in the head and neck are similar with different head and neck disorders can present to physician as otalgia. Adequate treatment outcome require adequate good history taking on ear with head and neck pathology, thorough physical examinations and referral for consultations with specialists from other specialty may be mandatory in case of normal ear findings.

Prevalence of referred otalgia in this study was 4.4%. Prevalence of referred otalgia were higher in other studies.<sup>[5,21]</sup> These findings may be multifactorial such as

low referral of patients, usage of alternative therapy, over the counter medication, herbs medication and so on.

This study further revealed highest prevalence of referred otalgia at third decades of life because of the high activities in this age group. Male are commoner respondent than Female counterpart. Similar findings were noted in other study.<sup>[11]</sup> This may be because male are more prone to injuries and infections with better uptake of essential surgical care than female counterpart. Similar findings were noted in other study.<sup>[22]</sup>

Majority of the patients were urban dwellers. One of the major challenges facing health care providers in ear, nose and throat surgical care is the inequity in the provision and utilization of the care. There is need for more regional facilities to deliver surgical care.

This study revealed referred otalgia prevalence increased with level of education. It noticed to be higher in post-Secondary and graduate.

Contributions of the marital status cannot be overemphasized in this study as majority of the patients with referred otalgia were single. This may be because greater proportions of the studied population with referred otalgia were younger age groups.

Referred otalgia patients were mainly reviewed in ear, nose and throat clinic. This is because both outpatient clinic and casualty are the main entry point for patients to the hospital.

Detailed otorhinolaryngological, head and neck history, medical and surgical history and thorough physical examination of head and neck are highly recommended for patients with referred otalgia. In this study the order of the most frequent etiology of referred otalgia was found to be tonsillitis, temporomandibular joint disorder, pharyngitis, laryngeal disorder and dental disorder. Studies with contrary frequent cause were also noted.<sup>[22,23]</sup>

In this study right ear referred otalgia was more common than both left and bilateral otalgia. This is mostly likely be an incidental findings. Referred otalgia in this study was chronic at presentation and mostly single episode. These features help in determining the nature of the pathology and subsequent management. Poor treatment of acute disease by nonspecialist may leads to prolonged pathology and hence chronic diseases.

Accompany symptoms of otalgia are very helpful in the diagnosis and management of otalgia. Also, it is essential to confirm the pattern of accompanying symptoms. In this study, in addition to earache, post nasal drip, hawking, toothache, sore throat and rhinorrhea accompany referred otalgia. The findings in this study is consistent with outcomes of previous work.<sup>[11,12]</sup>

In this study, impact of referred otalgia upon patient's quality of life was observed. It is important to note that referred otalgia has many negative repercussions on the sufferer. The effect on quality of life includes sleep disturbance, sexual dysfunction, social functioning, absenteeism, fatigue, headache and poor emotional balance can be often found in otalgia patients. Anxiety and depression should be noted and be rule out. Referred otalgia may be secondary to neuralgia or severe enough to warrant psychiatric consultation, referral and intervention.<sup>[24]</sup>

Patients with diagnosis of referred otalgia were mainly referred to ear, nose and throat department by the general practitioners, paediatricians and self reporting. This is because general outpatient department with both adult and children accident and emergency are the main entry point for patients to the hospital. Emergency cases were common at night due to pain interference with patient's relaxation, pleasure and sleep in the studied population.

Majority of the patients with referred otalgia were not on treatment during the study by the otorhinolaryngologist, head and neck surgeon. Even majority of those patients on treatment were not satisfied. This is due to poor understanding of aetiopathogenesis and management of referred otalgia by person that instituted the treatment.

## CONCLUSION

Prevalence of referred otalgia is lower in this study than those in other previous studies. Tonsillitis is the commonest cause in our study. Patient presenting with otalgia requires detail ear, nose, throat, head and neck history and examination to arrive at definitive diagnosis. Patient with otalgia should be referred to the specialist for appropriate and timely therapy.

## FINANCIAL SUPPORT AND SPONSORSHIP

Nil.

## CONFLICTS OF INTEREST

There are no conflicts of interest.

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